PILOT PRO™

IGNITION SERIES

OPERATIONS MANUAL

The Combustex Pilot Pro™ 800

Pilot Burner Assembly with Ignition & Flame Failure Monitor

Safe, ***reliable*** **ignition and flame failure** ***protection*** **combined with a** ***proven***, **completely** ***self-powered*** **pilot head.**

COMBUSTEX
BURNER IGNITION & CONTROL SYSTEMS

CANALTA CONTROLS GROUP

KEY FEATURES

- Heavy-duty low temperature piezo electric igniter, providing reliable self-powered ignition.
- Failsafe thermocouple-powered gas valve ensures the pilot flame is proven before the main fuel valve will open.
- Integral Venturi System aspirates combustion air through a built-in flame arrester.
- Built-in automatic lockout eliminates the need for costly auxiliary controls
- Unique 316 SS pilot assembly easily installs and retracts through a standard 1" NPT collar.
- Low fuel consumption design enables feasible natural gas or propane-based operation.
- Stainless steel and aluminum construction.
- High temperature Mica Ignition lead channeled through the mixing tube eliminates lead deterioration.

TECHNICAL SPECIFICATIONS

Operating Temperature	-40°C to +40°C
Materials and Parts	Anodized Aluminum, 316 SS
Valve Seals	Buna N Standard, Viton Optional
Gauge Ports	1/8" NPT
Supply / Output Ports	1/4" NPT
Max. Working Pressure	30 PSI
Min. Working Pressure	5 PSI
Mounting	1" Male NPT
Supply Pressure	Filtered 20 PSI Natural Gas or Propane
Pilot Fuel Consumption	7 SCFH, 7,000 BTU/Hr.
Ignition	15KV Low Temperature Piezo
Environment Rating	Class 1, Div. 2 Hazardous Location
Power	Self-powered - 30mV Thermopile
Insertion Length	Multiples of 1 ft. or Custom Built
Main Gas Direct Feed	750,000 BTU/Hr.

The Combustex Pilot Pro™ 800

Pilot Burner Assembly with Ignition & Flame Failure Monitor

OPERATIONS MANUAL

Combustex recommends that this manual be read thoroughly *before* attempting installation or operation of the Pilot Pro™ 800. SAFETY FIRST.

CONTENTS

OPERATIONAL DESCRIPTION

The Pilot Pro™ 800 Pilot Burner System provides the three primary functions required to establish and maintain the pilot and main burner reliably and safely:

- Pilot flame ignition and confirmation before allowing main burner on.
- Venturi aspiration for proper fuel/air mixing (for pilot flame).
- Both pilot and main fuel gas shutoff and lockout after flame fail.

A clean natural gas or propane supply is required on the supply port. When the pilot fuel gas valve is depressed, it allows gas to feed the pilot and holds the lower valve open. After the pilot is lit and the thermocouple has reached sufficient temperature (usually within 15-20 seconds), the lower valve will remain latched upon release of the push button.

The output port will remain closed until the flame has been confirmed and the push button has been released.

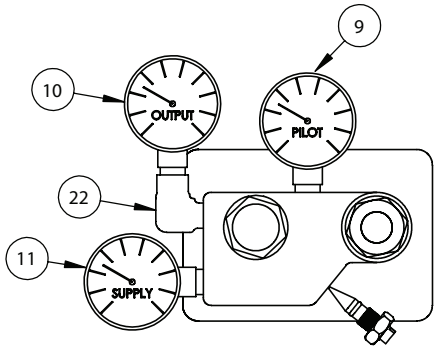
Within one minute of flame failure, the thermocouple will cool off and release the lower valve. The main supply port is now blocked. The remaining output signal now bleeds to atmosphere through the pilot burner ensuring no pressure in either pilot or main lines.

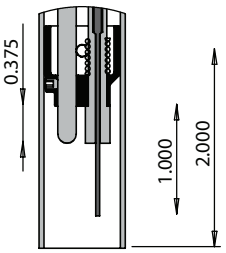
COMBUSTEX
BURNER IGNITION & CONTROL SYSTEMS
A Canalta Controls Company

For operational, technical or installation assistance, please contact us.

Phone: 403.342.4494 | **Web:** www.combustex.com

Call Us Toll Free: *1-855-226-2582*

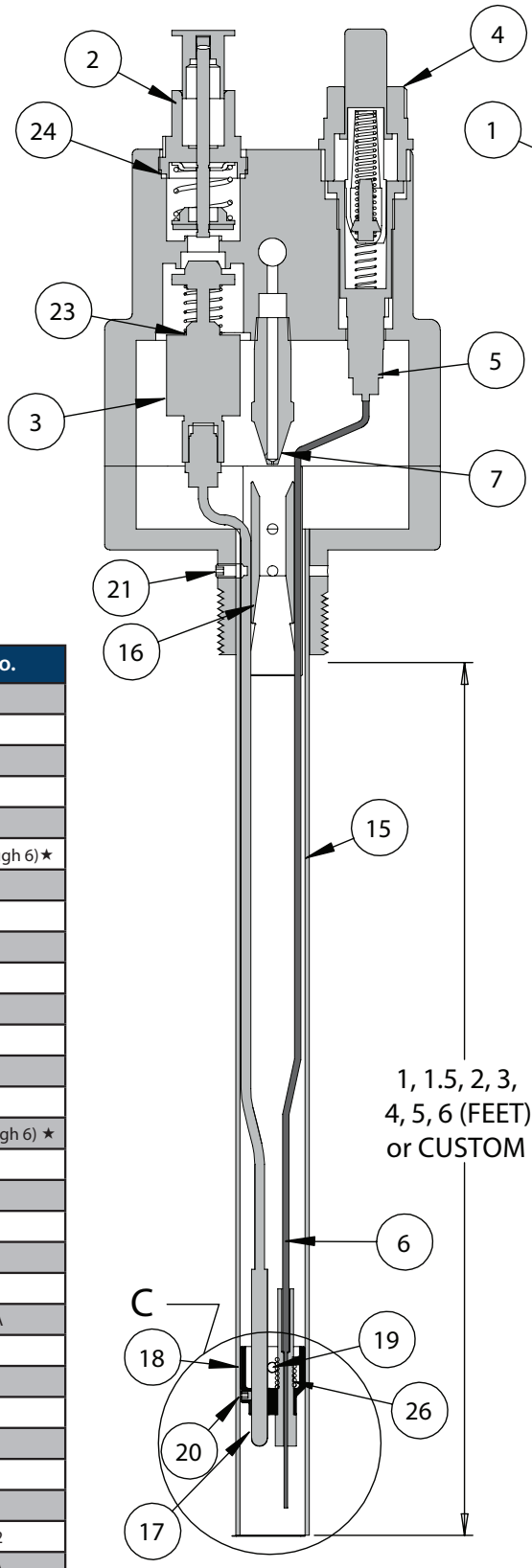




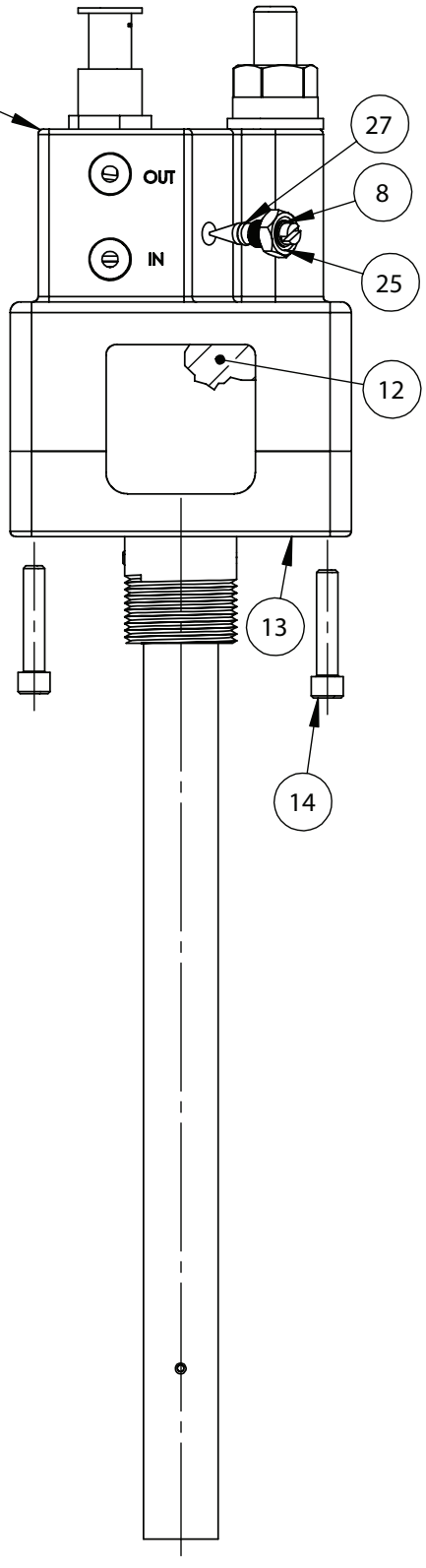
DETAIL C
SCALE 1 : 1.5

Item	Qty.	Description	Part No.
1	1	Top Body	1064
2	1	Upper Gas Valve Assembly	1065
3	1	Lower Gas Valve Assembly	1066
4	1	Igniter Push Button & Body Assembly	1067
5	1	Piezo Igniter Assembly	1068
6	1	Ignition Lead Wire Assembly	2004-(1 through 6)★
7	1	Pilot Jet	1075
8	1	Pilot Valve	1097-1
9	1	Pilot Gauge	1077
10	1	Output Gauge	1078
11	1	Supply Gauge	1079
12	1	Flame Arrestor	1080
13	1	Bottom Body	1081
14	4	1/4-20 x 1 1/4 Socket Cap Screws	1082
15	1	7/8 x 0.049 SS Tubing	1083-(1 through 6) ★
16	1	Venturi	1084
17	1	24"Thermocouple	1085
17	1	36"Thermocouple	1086
17	1	48"Thermocouple	1087
17	1	72"Thermocouple	1088
18	1	Burn Tip	1089 A
19	2	Burn Tip Dowel Pin	1090
20	1	Thermocouple Set Screw	1098
21	1	Venturi Set Screw	1101
22	1	1/8" NPT Street Elbow	1094
23	1	Lower Valve Gasket	1095
24	1	Upper Valve Gasket	1096
25	1	Lock Nut	1097-2
26	1	Ceramic Retainer Spring	1098 A
27	1	Pilot Valve O-ring	1099

★ *Part number suffix indicates insertion length.*
E.g. 2004-2 = 2 ft. insertion length.



SECTION VIEW



BOTTOM VIEW

INSTALLATION GUIDELINES

The mounting location chosen on the vessel should be determined by

- Operator accessibility and visibility
- Accessibility / entry into the fire tube
- Ease of tubing installation

The recommended mounting configurations of the Pilot Pro™ 800 are

- Parallel Mount - Front side of the fire tube directly below the main burner with the tip of the pilot approximately 1.5 Inches behind the end of the main burner. (See drawing p. 4)
- Angle Mount - Where the flame arrestor impedes front mounting, the side entry is necessary. (See drawing p. 5)

Either mounting method will require a 1" NPT union and nipple welded to the vessel to accept the male thread of the Pilot Pro™ 800 body. Adjust the length of this to suit standard lengths wherever possible. Use an approved aluminum thread lubricant when installing the unit.

When the igniter length exceeds 48", it should be supported at about midpoint with either a 'J' bracket or cross support.

Installation as per the included P&ID drawings is recommended. A clean, steady gas supply is required for optimum reliable operation. It is recommended that a filtered instrument regulator be installed upstream at the point where the instrument gas is tapped off the main supply.

The Pilot Pro™ 800 is not rated for sour gas service. One can expect lower reliability and higher maintenance when operated on this type of fuel. Where only sour or wet fuel is available, it may be advantageous to operate the pilot and instruments from an auxiliary propane source.

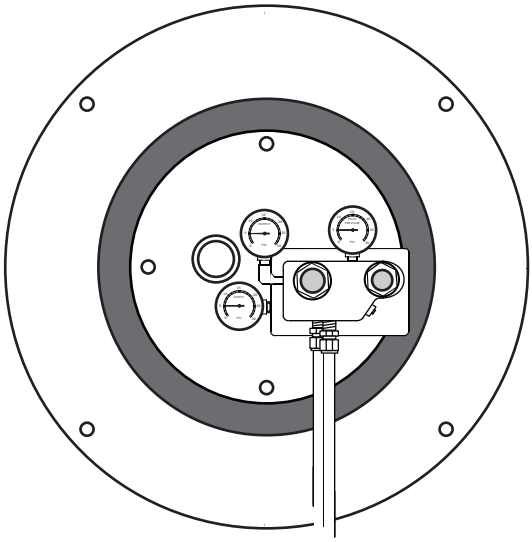
When wet fuel may be present, an installed coalescing filter will reduce fouling problems. To help alleviate freeze-ups associated with wet fuel, the following precautions can be taken.

- Keep the lines as short as possible, and slope them back towards a drip pot located in a heated enclosure.
- Run fuel supply lines under the vessel insulation or heat and insulate fuel lines via other methods.
- Use lower supply pressures to reduce the pressure drop across the pilot valve.

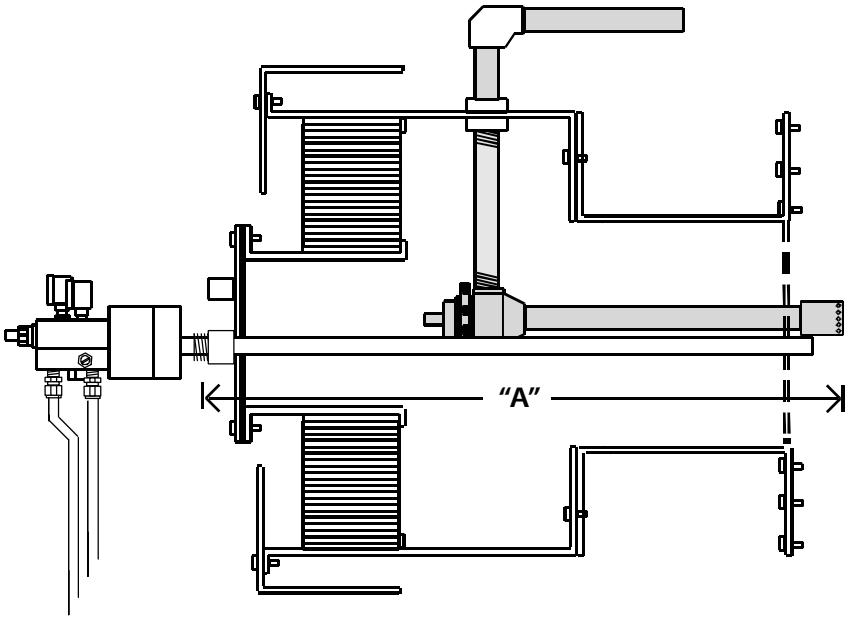
Combustex Pilot Pro™ 800

Parallel Mount Pilot Burner Installation

Back View



Side View



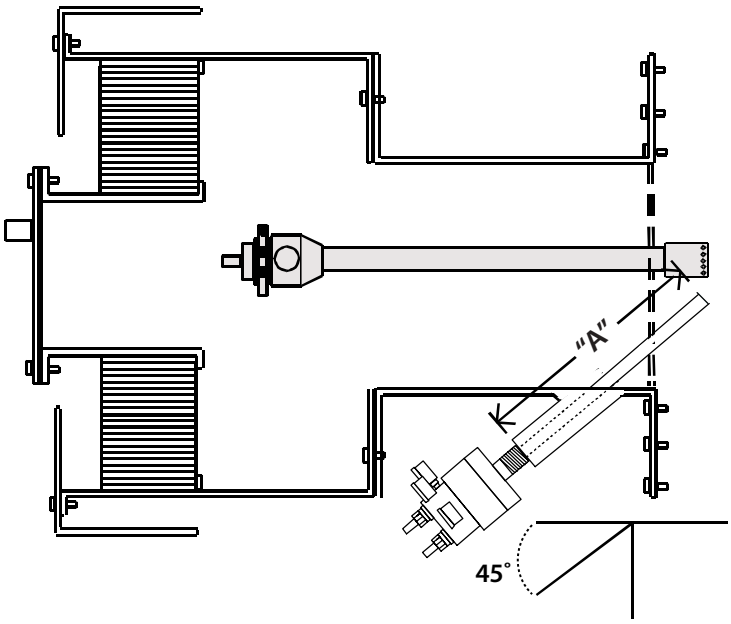
Notes

- "A" dimension (length from outside end of a 1" collar to the tip of main fuel nozzle) required when ordering prefabricated units. Size to standard lengths when possible.
- End of Pilot Pro™ 800 igniter unit should be approximately 1.5" behind main burner.
- Mount level or pointed down. Avoid pointing unit upwards.

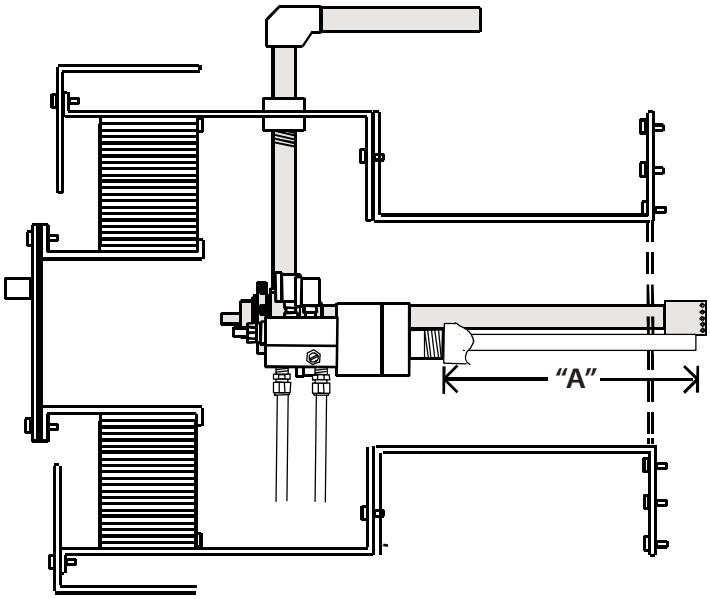
Combustex Pilot Pro™ 800

Side Angle Mount Pilot Burner Installation

Top View



Side View

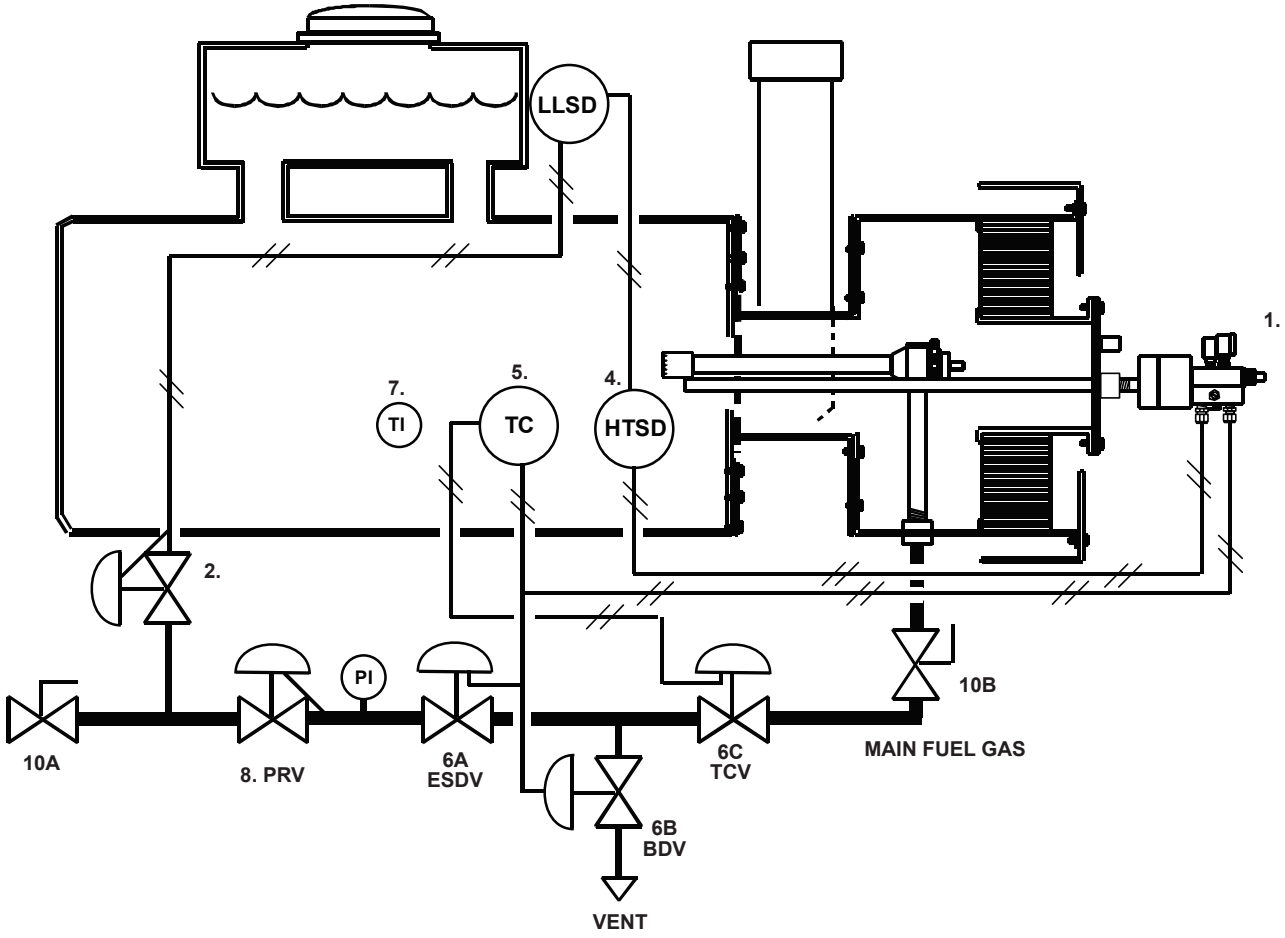


Notes

- "A" dimension (length from outside end of a 1" collar to the tip of main fuel nozzle) required when ordering prefabricated units. Size to standard lengths when possible.
- End of Pilot Pro™ 800 igniter unit should be approximately 1.5" behind main burner.
- Do not exceed an angle greater than 45 degrees.
- Mount level or pointed down. Avoid pointing unit upwards.

Combustex Pilot Pro™ 800

Clean Dry Natural Gas Installation



Bill of Materials

1. Pilot Pro™ 800 Controller (Igniter, Flame Failure Protection & Pilot Assembly)
2. 0 - 30 Psi Pressure Regulator
3. Pneumatic Level Switch
4. Pneumatic High Temp. Shut Down
5. Pneumatic Temperature Control
6. Combustex Series 100 1" Temp Control Valve
7. Temperature Indicator
8. 1" Pressure Regulator
9. Pressure Gauge
10. (A, B) Manual Block Valve

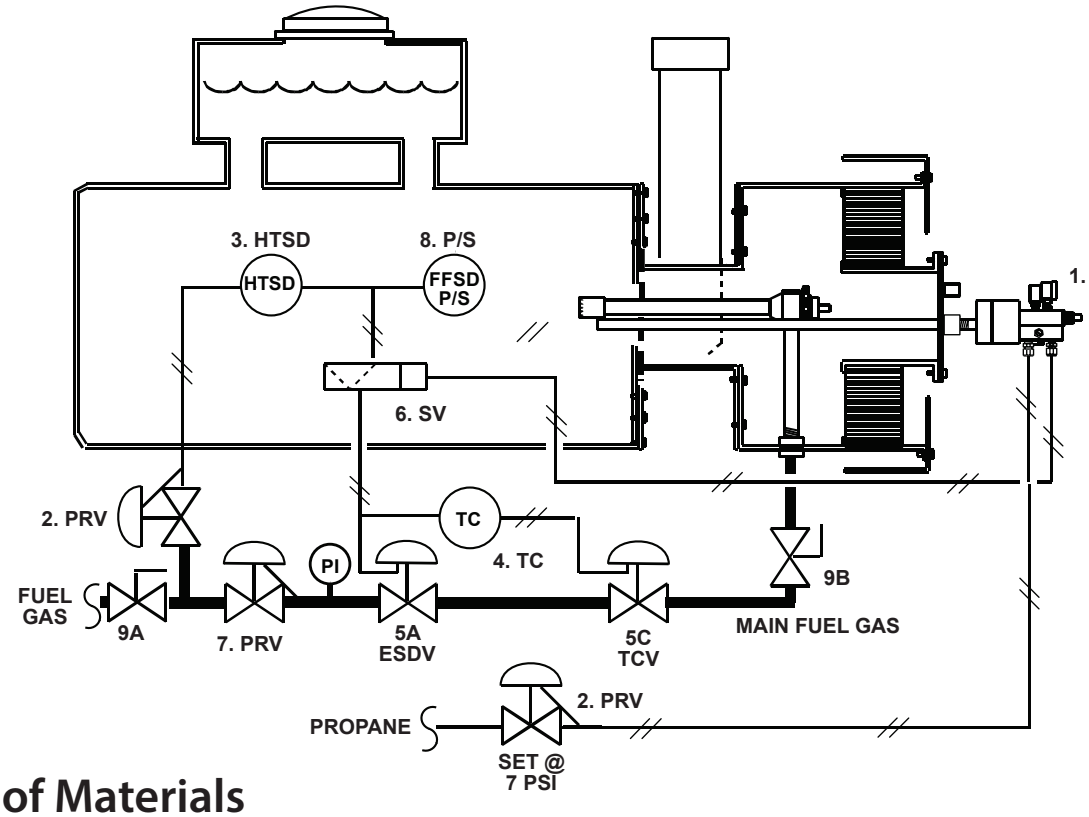
Combustex Pilot Pro™ 800

Propane / Wet Fuel Gas Installation

Modifications

- Adjust pilot regulator to 10 - 15 Psi
- Adjust pilot adjustment needle valve in the Pilot Pro™ 800 body to 5 - 7 Psi
- Ensure switching valve actuates at unit output pressure

These adjustments will reduce the pressure drop across the pilot adjustment needle valve, minimizing freeze-up with wet fuel gas and pressure fluctuations due to propane compressibility during low temperature operations.



Bill of Materials

1. Pilot Pro™ 800 Controller (Igniter, Flame Failure Protection & Pilot Assembly)
2. 0 - 30 Psi Pressure Regulator
3. Pneumatic High Temp. Shut Down
4. Pneumatic Temperature Control
5. Combustex Series 100 1" Temp Control Valve
6. 3-way Switching Valve
7. 1" Pressure Regulator
8. Pressure Switch
9. (A, B) Manual Block Valve

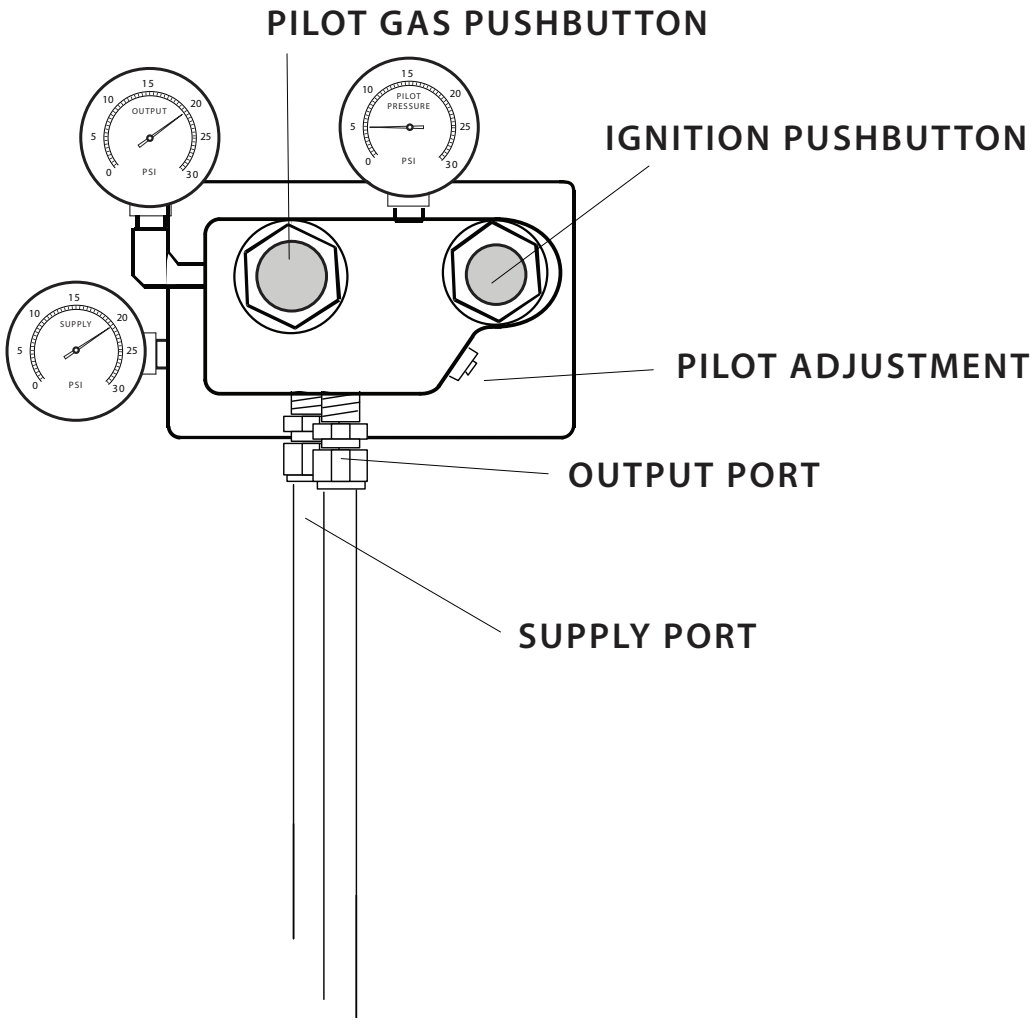
START-UP PROCEDURE

NOTE: It is the responsibility of the operator to ensure that the fire tube is purged of combustible mixtures prior to lighting any pilot. Due to the possibility of a control valve leak, the main fuel gas block valve should be closed for the required time to purge the fire tube.

Check the integrity of all fittings. Purge the air and debris out of the lines up to the unit. The pilot adjustment valve has been factory set for use with a 20 Psi supply, and should not require adjustment. If a different supply pressure is used, adjust the pilot needle valve for a pilot pressure of 4-6 Psi. Adjust for a 4-5" flame. Too large or small of a flame may affect the thermocouple operation.

OPERATING & LIGHTING PROCEDURE

1. Ensure the main fuel gas valve is closed and the fire tube is air purged.
2. Open the pilot line manual block valve.
3. Verify approximately 20 Psi supply pressure to the unit.
4. Depress the pilot gas push button and hold.
5. Tune the pilot pressure to approximately 6 Psi by turning the pilot adjustment needle valve.
6. Depress the ignition push button repeatedly until the pilot flame is confirmed.
7. Continue to hold the pilot gas push button for approximately 10 seconds.
8. Release the push button and verify the presence of output pressure (output pressure should match supply pressure).
9. Slowly open the main fuel gas valve to ignite the main burner.



MAINTENANCE REQUIREMENTS

For trouble free operation, a maintenance and inspection schedule should be kept. Every 3 months test the ignition and shutoff features. The unit should lockout the pilot and main gas within one minute after flame fail. Should this not occur, refer to the troubleshooting guide. Once a year remove and dismantle the upper and lower valves. Inspect, clean and replace components as necessary. The flame arrestor should be inspected for blockages, built-up residue and heat damage. All seams and seals around the flame arrestor and igniter body should be free of cracks or holes that might let a flame escape. If any of these conditions are found, the element should be cleaned or replaced prior to returning to service. Inspect, clean and replace the ignition components as required.

Combustex offers a service kit for the Pilot Pro™ 800 complete with 1 year recommended spare parts. This package contains the following items:

Item	Qty.	Description	Part No.
2	1	Upper Gas Valve Assembly	1065
3	1	Lower Gas Valve Assembly	1066
5	1	Piezo Igniter Assembly	1068
6	1	Ignition Lead Wire Assembly	2004-(1 through 6)★
9	1	Pilot Gauge	1077
10	1	Output Gauge	1078
11	1	Supply Gauge	1079
12	1	Flame Arrestor	1080
17	1	Thermocouple (24", 36", 48" or 72")	1085
18	1	Burn Tip	1089 A
19	2	Burn Tip Dowel Pin	1090
20	1	Thermocouple Set Screw	1098
21	1	Venturi Set Screw	1101
23	1	Lower Valve Gasket	1095
24	1	Upper Valve Gasket	1096
26	1	Ceramic Retainer Spring	1098 A

★ *Part number suffix indicates insertion length.*
E.g. 2004-2 = 2 ft. insertion length.

TROUBLE SHOOTING GUIDE

Problem: Unit Fails to light

i. Fault - Fuel Gas Failure

Ensure that dry, clean fuel gas is available at the supply port. Interconnected safety shutdown devices such as high temperature or low-level switches may be holding the supply off. On newly installed units, ensure that the supply and output lines have been purged of dirt and debris. Fuel gas freeze-ups can be minimized with coalescing filters, insulated lines, or via preheating the fuel. Supply lines run under the vessel insulation or through the heater bath will eliminate the problem on most installations.

ii. Fault - Internal Orifice is plugged

Remove the unit and check for gas coming from the pilot jet when the fuel gas push button is depressed. If there is no gas present at this orifice, remove the pilot jet and clean the #75 orifice. If the problem persists, remove the pilot adjustment valve and the pilot jet and check for debris within. After lighting, adjust the pilot to the desired flame level. Typically, a 4-6 pound pilot is desirable. An instrument filter regulator installed upstream on the supply will eliminate particle fouling, while a coalescing filter upstream will minimize condensate fouling.

iii. Fault - Spark Failure

The piezo igniter unit will snap each time the push button is depressed. If not, the unit should be replaced or repaired. To confirm the spark is present at the igniters tip, the unit should be removed and sparking confirmed visually. The most common reason for spark failure is ignition lead wire deterioration. To test the piezo igniter, remove the ignition lead from the unit and hold a screw driver contacting the aluminium housing and within 1/4" of the piezo tip. If the spark fails to jump at least 1/4", replace the piezo assembly. Reconnect the ignition lead wire, and carry out the same procedure at the opposite end of the wire to confirm lead integrity. Replace if required.

Problem: Intermittent Flame Failure

i. Fault - High Temperature Bath Shutdown

Ensure that the high temperature shutdown switch is set properly and that the temperature control circuit is functioning properly. When the high temperature switch is tripped, it will lock out gas to the Pilot Pro™ 800, and it may appear as a flame failure as the switch will eventually reset and allow a re-light.

ii. Fault - Interconnected Device Shutdown

Determine if any interconnected shutdown devices are shutting down the unit intermittently. Tattle tale pop out devices can be installed temporarily in the vents of the devices to determine the faulty one.

iii. Fault - Poor Flame Contact

Should the unit shutdown for no apparent reason shortly after the main burner turns on, it may be the pilot flame is being pulled away from the thermocouple. To confirm if this is occurring, try running the pilot only, with the main burner blocked in for a period of time. If the unit operates normally under this situation, but shuts down once the main flame gas is opened, the problem is likely excessive draft being drawn by the main burner. Ensure that end of pilot is approximately 1.5" behind the main burner.

iv. Fault - Inconsistent Gas Supply

Ensure that the fuel gas is dry and clean. Refer to the "Fuel Gas Fail" and the "Internal Orifices Plugged" sections above for more details.

Problem: Unit lights, but output will not match supply pressure

i. Fault - Thermocouple Failure

Confirm visually that the flame is striking the thermocouple. The unit should be capable of latch within 30 seconds of flame ignition. Under normal flame conditions, the thermocouple should have an output of 30mV. Replace the thermocouple if the output is low or takes an extended period of time to climb.

ii. Fault - Coil Failure

Should the thermocouple test positive, the lower gas valve assembly should be removed and cleaned. If this fails to work, the unit should be replaced.

NOTES

COMBUSTEX
BURNER IGNITION & CONTROL SYSTEMS
A Canalta Controls Company

For operational, technical or installation assistance, please contact us.

Phone: 403.342.4494 | **Web:** www.combustex.com

Call Us Toll Free: *1-855-226-2582*